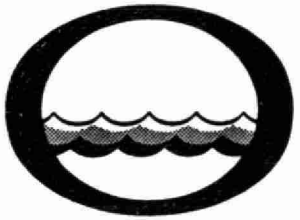
1971 OPERATING SUMMARY

ELORA

WATER POLLUTION CONTROL PLANT



Water management in Ontario

Ontario
Water Resources
Commission

We are pleased to submit for your consideration a summary of operation during 1971 of the water pollution control plant serving your community.

This operating summary contains parameters normally used to measure plant performance and loading, as well as relevant cost data. Because of the concern over eutrophication of our lakes and of the requirement, in many parts of Ontario, to remove the major contributing factor, results of analysis for phosphorus appear in this summary.

D.S. Caverly,
General Manager.

D.A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

ELORA

WATER POLLUTION CONTROL PLANT

operated for

THE VILLAGE OF ELORA

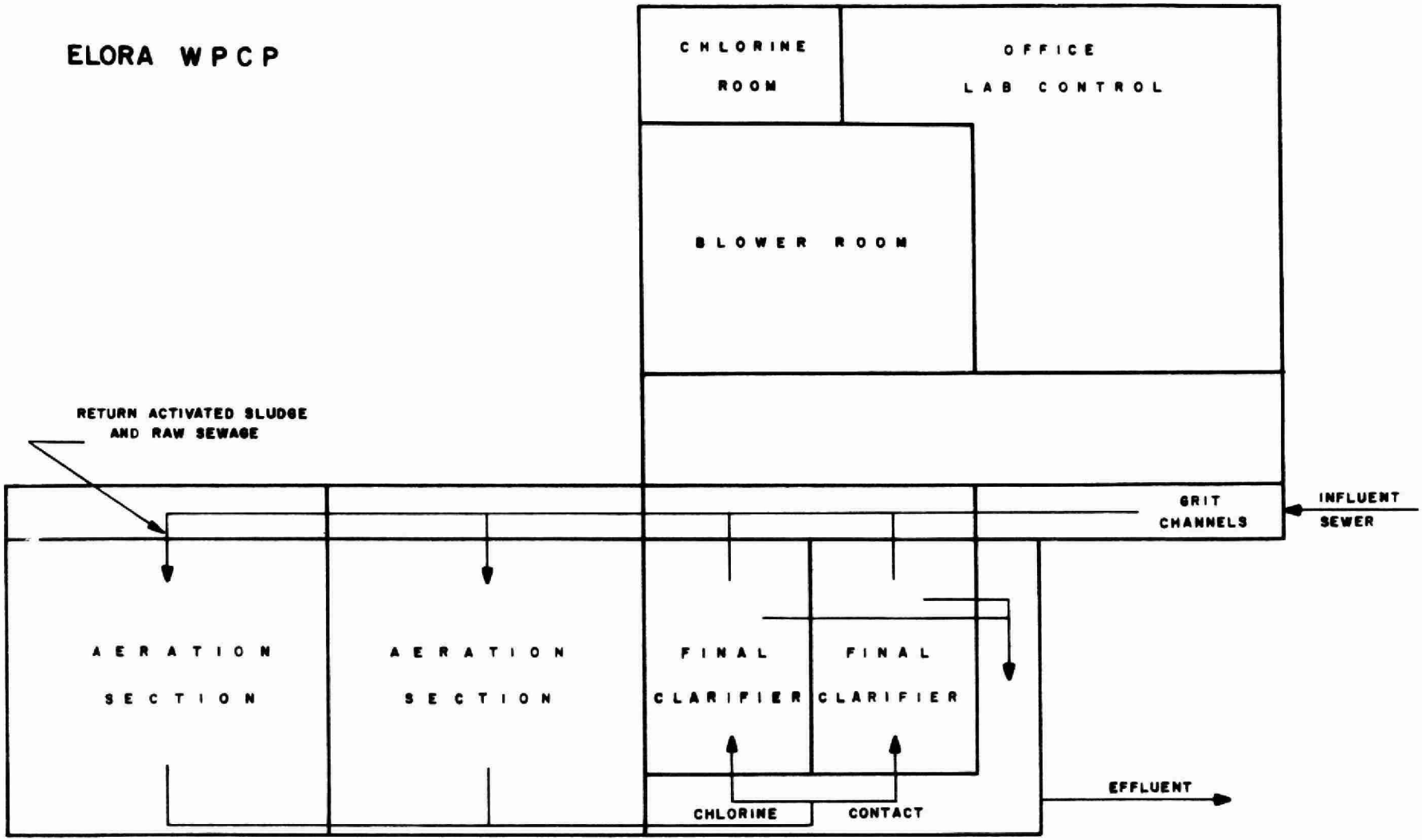
by the

ONTARIO WATER RESOURCES COMMISSION

1971 ANNUAL OPERATING SUMMARY

CONTENTS

ELORA WPCP


CHLORINE ROOM
OFFICE LAB CONTROL
BLOWER ROOM
RETURN ACTIVATED SLUDGE AND RAW SEWAGE
GRIT CHANNELS
INFLUENT SEWER
AERATION SECTION
AERATION SECTION
FINAL CLARIFIER
FINAL CLARIFIER
CHLORINE CONTACT
EFFLUENT

DESIGN DATA

PROJECT NO.	2-0125-62
TREATMENT	Extended Aeration
DESIGN FLOW	0.083 mgd
DESIGN POPULATION	1,000
BOD - Raw Sewage	210 mg/l
SS - Raw Sewage	250 mg/l

PRETREATMENT

Screening (at pumping station)

- Two coarse bar screens

Pumps - Robert Morse

- Two 300 gpm (electric) @ 47' tdh

Grit Removal

Type: Grit channels
Size: Two 10' x 2'

SECONDARY TREATMENT

Aeration Tanks

Type: Single-pass
Size: Two 32' x 20' x 11' (14,100 cu ft or 87,800 gal)
Retention: 25.4 hr

Air Supply

Type: Sutorbilt; variable speed pulley
Size: Two 183-370 cfm each

Diffusers

Type: Spargers
Size: 16 per tank @ 2' centres

Secondary Sedimentation

Type: Walker Process
Size: Two 26' x 6' x 7'9" deep (7,500 gal)
Retention: 4.3 hr
Loading: Surface, 266 gal/ft^2/day
Weir, 1,500 gal/ft/day

CHLORINATION

Type: Advance, Model 101

Chlorine Contact Chamber

Size: 13' x 5' x 6' deep (2,180 gal)
Retention: 37.7 min

OUTFALL

- 12" dia pipe to Grand River

SLUDGE HANDLING

Type: Thickening tank
Size: 27' x 20' 8" x 11' 9" (avg)
(6,750 cu ft or 42,000 gal)

'71 Review

GENERAL

The Elora Water Pollution Control Plant is a 0.083 MGD extended aeration activated sludge plant consisting of screening facilities, grit channel, aeration, final settling, chlorination, and sludge holding facilities. There is a remote pumping station associated with this project.

During the year the Town engaged a consulting engineer to prepare a preliminary report on the expansion of the Elora Water Pollution Control Plant.

Both the Elora and Fergus Water Pollution Control Plants were operated by staff stationed at Fergus during the year. Under the supervision of head office engineers, the staff operated a clean, attractive and efficient plant for the Village of Elora.

EXPENDITURES

The total operating cost for the year was $11,822.19 or $295.55 per million gallons of sewage treated. The unit cost of treating one pound of BOD was 21 cents.

PLANT FLOWS and CHLORINATION

The total raw sewage flow treated at the plant was estimated to be 40 million gallons, an increase of 16.2 million gallons from 1970. This represented an average daily flow of 0.11 million gallons or 132 percent of the plant's design capacity of 0.083 mgd.

An average chlorine dosage of 4.0 mg/l was required to maintain an average chlorine residual in the final effluent of 0.5 mg/l before being discharged into the Grand River.

AERATION

The average MLSS concentration of 5400 mg/l and F/M ratio of 0.03 are within the limits of good extended aeration operation.

PLANT EFFICIENCY

The average BOD and suspended solids concentrations in the influent were 127 and 219 mg/l respectively. The effluent BOD and suspended solids concentrations of 32 and 22 mg/l were above the OWRC objectives of 15 mg/l for each. Removal efficiencies for BOD and suspended solids were 75 and 90 percent respectively.

A polyelectrolyte was used to assist final clarification during periods of high flow.

CONCLUSIONS

With the aid of polyelectrolyte the Elora plant produced a fair effluent.

The high flows and low influent BOD concentrations would tend to indicate an infiltration problem in the sewer system. It is recommended that the Village of Elora undertake a thorough examination of the sewage collection system to determine the sources of infiltration and then take the appropriate remedial action as required.

PROJECT COSTS

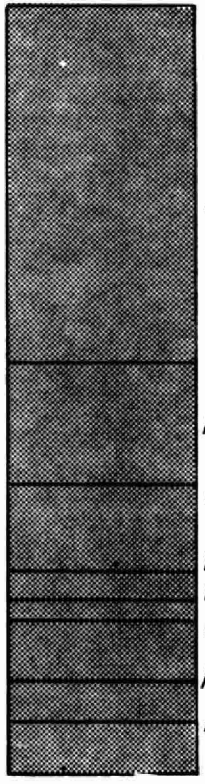
NET CAPITAL COST (Final)	$361,285.04
DEDUCT - Portion financed by CMHC/MDLB (Final)	163,655.86
Long Term Debt to OWRC	$197,629.18
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1971	$ 36,185.54
Net Operating	$ 11,822.19
Debt Retirement	2,137.00
Reserve	1,459.60
Interest Charged	11,085.19
TOTAL	$ 26,503.98

RESERVE ACCOUNT

Balance @ January 1, 1971	$ 15,343.32
Deposited by Municipality	1,459.60
Interest Earned	1,027.58
	$ 17,830.50
Less Expenditures	-
Balance @ December 31, 1971	$ 17,830.50

1971 COSTS

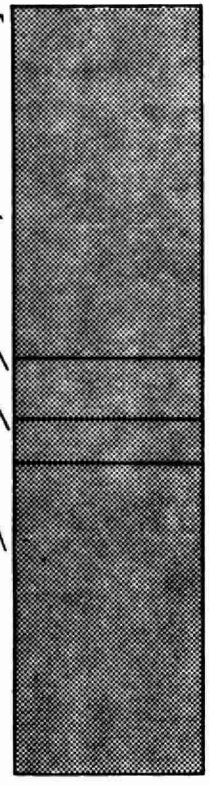
OPERATING COSTS



PAYROLL	47 %
FUEL	NIL %
POWER	16 %
CHEMICALS	12 %
GENERAL SUPPLIES	3 %
EQUIPMENT	2 %
REPAIRS & MAINTENANCE	8 %
SUNDRY	5 %
WATER	NIL %
TRAVEL	7 %

TOTAL ANNUAL COST

NET OPERATING	45 %
DEBT RETIREMENT	8 %
RESERVE	6 %
INTEREST	41 %



YEARLY OPERATING COSTS

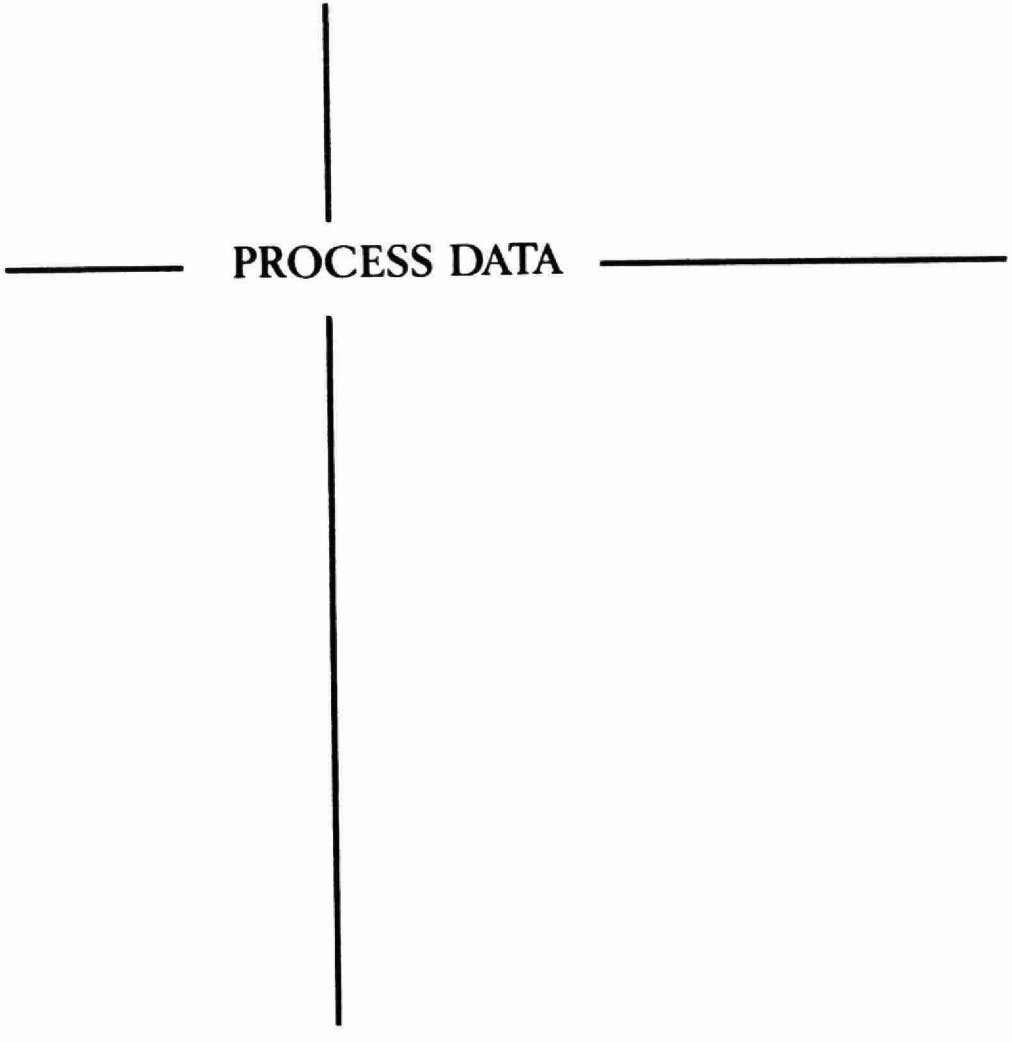
YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS	
			$ per million gal	¢ per lb BOD
1967	23.57	$6,370.25	$270.24	12 cents
1968	29.29	7,647.34	261.09	19 cents
1969	24.8*	5,743.38	231.59	17 cents
1970	23.8	7,746.20	325.40	16 cents
1971	40.0*	11,822.37	295.60	17 cents

* Estimated

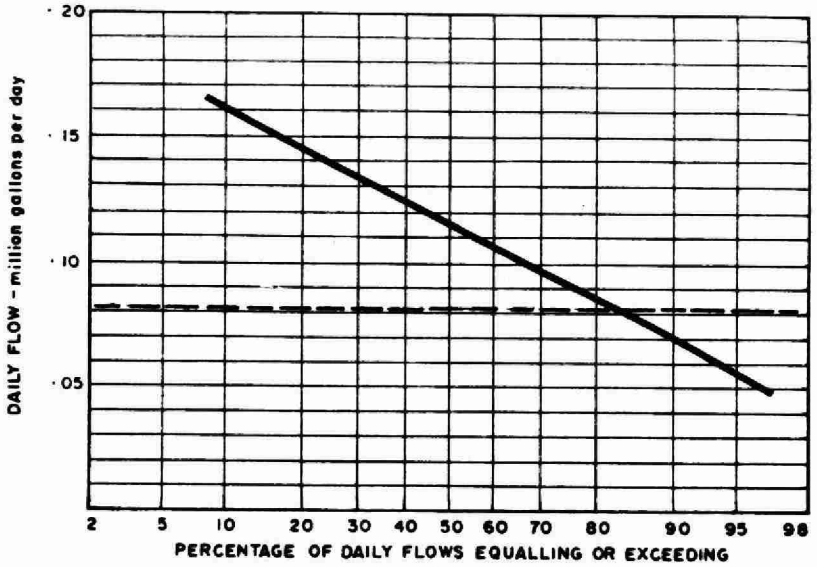
MONTHLY OPERATING COSTS

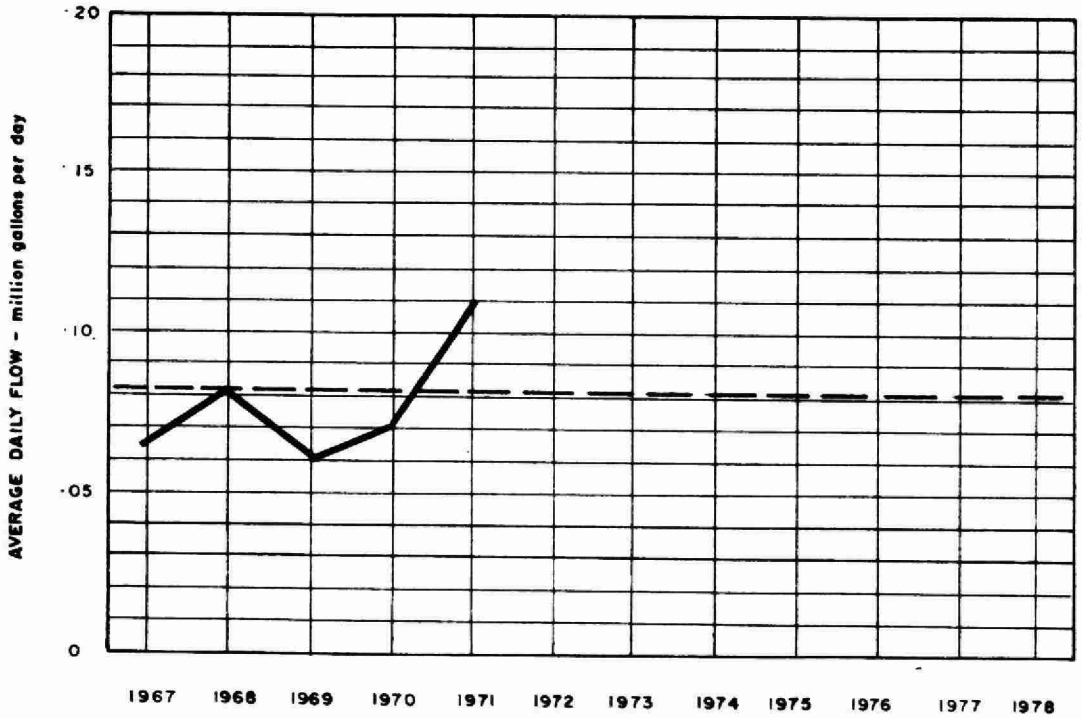
MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY*	WATER	TRAVEL
JAN	500.12	276.16	-	-	209.75	-	-	-	-	14.21	-	-
FEB	548.00	288.49	-	-	161.25	-	22.85	-	-	14.21	-	61.20
MAR	1769.91	366.57	-	-	193.00	1063.65	13.46	47.25	-	21.18	-	64.80
APR	1000.55	328.89	-	-	161.25	-	56.83	204.89	152.54	19.35	-	76.80
MAY	404.67	-	-	-	187.50	-	29.40	12.58	100.56	12.23	-	62.40
JUNE	794.87	295.79	-	-	123.75	175.10	30.01	-	70.00	29.42	-	70.80
JULY	988.81	746.81	-	-	105.00	-	18.40	-	-	34.30	-	84.30
AUG	323.73	-	-	-	138.75	-	4.90	-	101.68	78.40	-	-
SEPT	1203.66	501.96	-	-	112.50	278.25	25.13	-	-	163.42	-	122.40
OCT	212.72	-	-	-	123.75	-	4.90	-	-	14.47	-	69.60
NOV	494.73	-	-	-	138.75	-	154.68	-	-	132.00	-	69.30
DEC	3580.42	2719.70	3.71	-	186.94	(64.19)	39.81	-	475.82	114.53	-	104.10
TOTAL	11822.19	5524.37	3.71	-	1842.19	1452.81	400.37	264.72	900.60	647.72	-	785.70

Brackets indicate credit.


PROCESS DATA

FLOWS





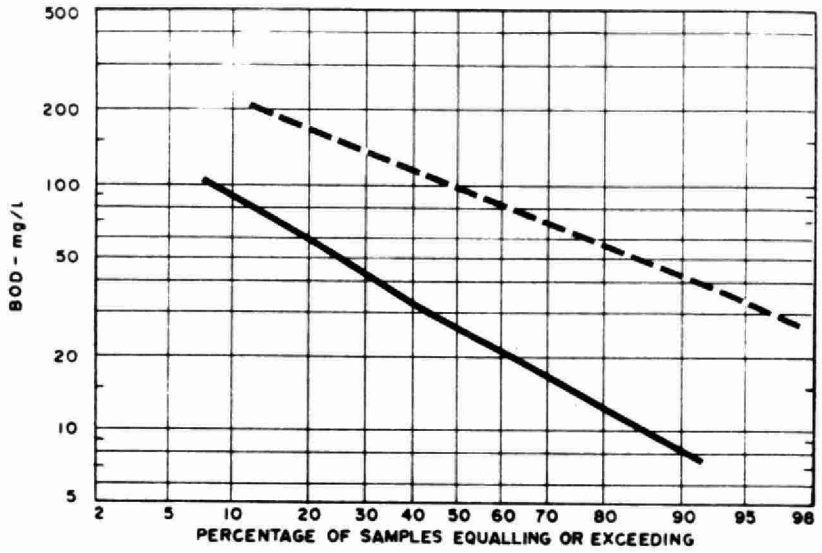
DESIGN CAPACITY _ _ _ _ _ _ _

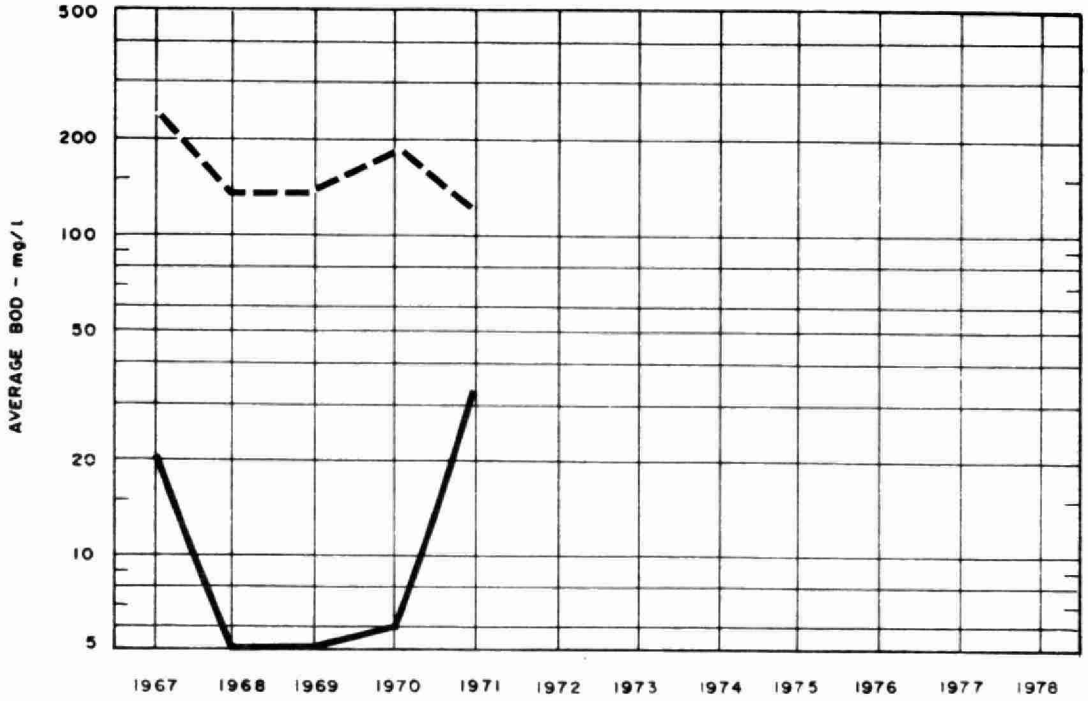
PLANT PERFORMANCE

MONTH	FLOWS				BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				TOTAL PHOSPHORUS		
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	MAXIMUM RATE	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDN
	million gallons	mil gal	mil gal	mgd	mg/l	mg/l	%	10^3 pounds	mg/l	mg/l	%	10^3 pounds	mg/l as P	mg/l as P	%
JAN	4.1	.13	.22	.30	250	10	96	9.7	418	11	97	16.4	9.3	7.6	18
FEB	1.3 a	.14	.19	.30	85	67	21	.7	175	52	70	4.9	8.6	7.3	15
MAR	3.2 b	.11	.16	.24	84	31	63	1.8	188	42	78	4.9	8.3	5.8	30
APR	3.6 c	.19	.26	.30	77	21	73	3.2	124	18	85	6.0	5.7	3.6	37
MAY					157	15	90		190	16	92		8.8	6.0	32
JUNE	2.4	.08	.12	.25	135	27	80	2.6	250	20	92	5.6	9.8	6.4	35
JULY	3.2	.10	.14	.30	600	7	99	19.2	306	18	94	9.3	28.0	3.0	89
AUG	3.5	.11	.12	.27	150	9	94	4.9	260	5	98	8.9	11.0	5.5	50
SEPT	2.7	.09	.12	.23	170	16	91	4.2	208	18	91	5.2	12.0	6.0	50
OCT	3.5	.11	.16	.30	260	44	83	7.5	234	14	94	7.7	19.0	5.5	71
NOV	2.6	.09	.11	.30	260	10	96	6.5	258	14	94	6.4	15.0	7.7	49
DEC	3.2	.11	.16	.30	155	45	71	3.6	231	18	92	6.9	11.8	7.7	35
TOTAL	40 (est)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG.	-	.11	MAXIMUM .26	MAXIMUM .30	127	32	75	5.8	219	22	90	7.5	10.7	6.0	44
No. of Samples	-	-	-	-	52	47	-	-	172	200	-	-	28	28	-

a - 9 days' flow
b - 29 days' flow
c - 19 days' flow

BIOCHEMICAL OXYGEN DEMAND

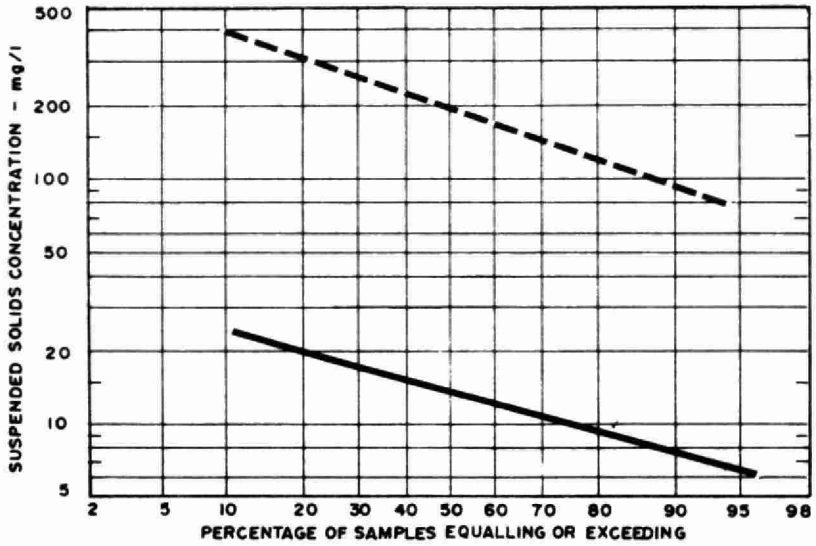


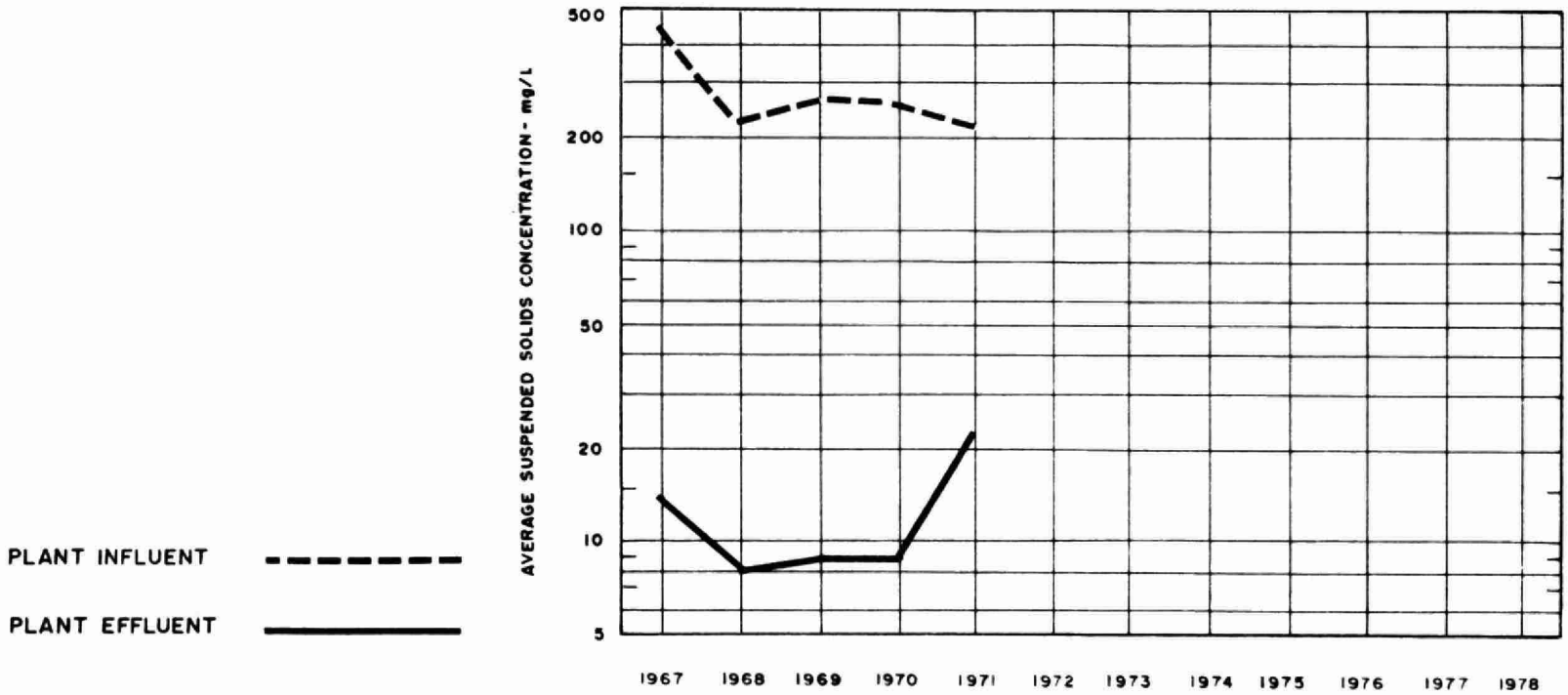


PLANT INFLUENT

PLANT EFFLUENT

SUSPENDED SOLIDS





TREATMENT DATA

MONTH	GRIT	CHLORINATION		AERATION			WASTE SLUDGE			AEROBIC DIGESTER			
	QUANTITY REMOVED cubic feet	Cl_2 USED pounds	AVG. DOSAGE mg/l	MLSS. CONC mg/l	F/M day^{-1}	AIR USED 1000 ft / lb BOD	QUANTITY 10 gallons	SUSPENDED SOLIDS mg/l	VOL. SOLIDS %	QUANTITY REMOVED 10 gallons	SUSPENDED SOLIDS mg/l	VOL. SOLIDS %	AMOUNT HAULED cubic yards
JAN	0	84	2.1	4360	.07	1.0	-	-					
FEB	0	94	2.8	4070	.02	75.5	-	-					
MAR	0	108	3.4	4440	.03	52.1	-	-					
APR	0	133	3.7	3730	.03	28.4	-	-					
MAY	0	111	-	5090	-	-		-					
JUNE	0	90	3.8	5030	.02	34.7	-	14800					
JULY	3	120	3.5	5500	.12	4.9	-	-					
AUG	6	106	3.0	5160	.04	19.1	-	-					
SEPT	0	130	4.8	4240	.04	2.2	-	-					
OCT	0	115	3.2	4310	.07	12.4	-	-					
NOV	0	89	4.8	4240	.06	21.7	-	13700					
DEC	0	104	3.2	4310	.05	26.0	-	2400					
TOTAL	9	1284	-	-	-	-	-	-	-		-	-	
AVG.	.2 cu. ft/mil gal	107	4.0	4540	.05	25.3	-	10300					